International Conference on Design & Operation of Container Ships

21-22 May 2014, RINA HQ, London, UK

www.rina.org.uk/Containership2014

For further information:
Call Jade on +44 (0) 20 7235 4622
or, email conference@rina.org.uk
10.45-11.15 COFFEE

11.15-11.50 INFLUENCE OF HULL FLEXIBILITY AND HULL GIRDER VIBRATIONS IN THE DESIGN OF MODERN ULTRA-LARGE CONTAINER SHIPS

Konstantinos Chatzitolios; Bureau Veritas; Karine Savreux; Tecnitas

The considerable increase in size of container ships and hull girder flexibility, as well as their weight, stability, resistance and powering for common operational conditions. Both designs utilized the same hull form but had different amounts of installed machinery which often operated off of its design condition. The importance of the operational profile for the longitudinal strength with respect to springing and whipping will be addressed as well as the added resistance due to waves.

11.50-12.25 HYDROELASTICITY OF VERY LARGE CONTAINER SHIPS ANALYSED BY COUPLING OF 1D STRUCTURAL MODEL AND 3D HYDRODYNAMIC MODEL

I. Senjanović, M. Tomić, N. Vladimir, N. Hadžić; University of Zagreb. Š. Malenica; Bureau Veritas.

There is no doubt that one of the main purposes in ship design is to maximize cargo capacity in the restricted dimension. The cargo capacity depends on the size of container ship. Complete hydroelastic response for the same vessel is determined by coupled 1D structural model and 3D hydrodynamic model as well as 3D structural and hydrodynamic model. The obtained results agree very well. In addition fatigue of structural elements exposed to high stress concentration is considered.

15.05-15.40 A NEW DESIGN OF CONTAINER CARRIERS FOR MAXIMIZING CARGO CAPACITY

Hong-Jin Li, Byung-Ki Choi, Hong-Ruel Ryu, Byeong-Rak Lee, Jade Yang; Hyundai Heavy Industries Co., Ltd. Bae-Seung Cho; Korea National University, Korea

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**WASTE HEAT RECOVERY SYSTEMS FOR CONTAINER SHIPS**

Yongjae Yu, Jongho Kim, Wonho Lee

Recent global recession has been prolonged as positioning ship owners to unfavourable business environment for several years. Most of shipping companies are currently trying to ascertain their energy efficiency levels and to find energy saving opportunities to survive in this hard time. For this reason, the ship energy management system is considered as a monitoring and evaluation tool for the cost reduction simultaneously satisfying SEEMP regulation. However, the accurate vessel performance evaluation is very difficult in actual seagoing conditions in reality. Vessel efficiency changes continuously lightend by the new innovative ship. The operational profile, slow steaming conditions. The optimal operation of the WHR-system in optimization studies to accurately assess the potential gains. The techno-economic results indicate a modular library of reconfigurable component models suitable for design, performance and transient profile is required. Here, we present the techno-economic assessment and optimisation of WHR design, operation and control of the entire integrated marine energy system throughout its mission to reduce fuel consumption or improve the ships speed. The systems amongst others are the operating instrument and tank and draft measurement systems. Algorithms based on Management Science techniques and in particular Operations Research techniques result in promising results for optimization of speed and fuel consumption. The influences of ship motions and non-linearities on weather effects are analyzed based on ISO correction method. The reasonable accuracy of vessel performance prediction is verified for the voyage from Busan in South Korea to Prince Rupert in Canada. Finally, energy saving potentials are discussed for each optimisation techniques.

**IMPROVE ENERGY EFFICIENCY IN CONTAINER SHIPS**

Volkert Bertram; FutureShip & Company

Containerhip operators are confronted with a multitude of proposals for fuel saving measures and even more promises. Actual savings are generally much lower than quoted numbers in advertisement material and even scientific publications. Reasons for discrepancies are discussed and some guidelines for selecting suitable measures are given. There are gold mines to be exploited (technical and operational options with significant fuel savings without decrease in performance) and mine fields to be avoided (false promises that result in zero savings or even losses). For a 4500 TEU containerhip, a case study illustrates realistic saving potential for retrofitting an existing ship and a newly designed, highly efficient ship. The case study shows that while significant improvements for existing ships are possible, the energy efficiency of new vessels is out of reach.

**MINIMIZE FUEL CONSUMPTION USING TRIM THE SHIPS LOADING COMPUTER AND ALARM MONITORING SYSTEM**

A.J. Bos; Director HMK CV

Minimizing fuel consumption is a major focus in the industry, the laws and regulations on this subject are continuously tightened by the renewed EEDI regulations. The International Maritime Organization (IMO) by means of At MEPC 62 (July 2011) stated the Energy Efficiency Design Index (EEDI) mandatory for new ships. Ship Energy Efficiency Management Plan (SEEMP) was made mandatory for all ships. A study has been conducted to design the ships systems to optimize the loading. Minimization of the ships weather effects are analyzed based on ISO correction method. The reasonable accuracy of vessel performance prediction is verified for the voyage from Busan in South Korea to Prince Rupert in Canada. Finally, energy saving potentials are discussed for each optimisation techniques.

**MODEL-BASED PERFORMANCE ASSESSMENT AND OPTIMISATION OF WASTE HEAT RECOVERY SYSTEMS FOR CONTAINERSHIPS**

Nikolaos M.P. Kakalis, Jasan C. Stefanatos, George G. Dimopoulos; Det Norske Veritas

Waste heat recovery (WHR) is a promising solution for efficient, cost-effective and environmentally friendly power generation onboard ocean-going vessels. However, the installation of such systems increases significantly the complexity of the power-plant with regards to machinery space and weight limitations, safety and operational constraints and higher capital costs. In addition, design parameters may change influencing the operational behaviour of the system, e.g. slow steaming. To address simultaneously such issues, a techno-economic approach to take into account the design, operation and control of the entire integrated marine energy system throughout its mission profile is required. Here, we present the techno-economic assessment and optimisation of WHR options for a 13000 TEU containership, currently under slow-steaming, via mathematical modelling and simulation techniques. A model of the integrated system of the vessel has been developed using a modular library of reconfigurable component models suitable for design, performance and transient operation analyses. The actual operational profile of the vessel was considered in the assessment and optimisation studies to accurately assess the potential gains. The techno-economic results indicate that there is clear potential for installing a WHR system in the vessel, based on net present value and payback period. However, the optimal configuration and potential gains strongly depend on the operational profile and slow steaming conditions. The optimal operation of the WHR-system in partial loads was also estimated and its minimum operational load was calculated. Via model-based approaches complex integrated systems can be successfully investigated providing effective decision support to system designers, integrators and owners/operators.

**INTO A GUN-ENGINE CONTAINER SHIP BY CONVERTING THE PROPULSION DIESEL ENGINE**

Claudiu Nichita, Tomad Nabejorg, Dmitriy Sonechko; Project Development and Naval Architecture

Wärtsilä Ship Design

In recent decades, the conventional choice of prime mover for container ships has been the diesel engine. Consequently, incorporation of the diesel engine in the overall design has been well explored. Continuing improvement of an established solution does, however, novel methods to achieve the same goals are rarely investigated. Interest of Gas Turbines for marine propulsion has not been popular for such ships due to the perceived inability of engines to satisfy the container ships’ requirements. This can in part, be seen as due to the current portfolio of gas turbines not being designed specifically for such operational needs. Several solutions to utilise the highest percentage of total energy of the ships’ fuel have been investigated to determine both impacts on ship and prime mover design. All these designs essentially fulfil the requirement to minimise the combined power requirements for not just propulsion but also accommodation, cargo and auxiliary power. Aspects that seem to be critical to the viability of such Gas Turbine powered ship designs include: the flexibility and form of the energy being supplied, the fuel type and consumption, and total ship efficiency. These have to be compared to conventional diesel driven container ships and to investigate the financial comparison for Gas Turbine powered container ships. It is clear that the current range of Gas Turbines is not suitable for application to any of the large container ship currently in service or on order. However, the study shows from a whole ship design impact that a more competitive option might be feasible if the gas turbine technology was more intimately integrated with other systems on the ship, which has the potential to meet likely emergent markets and regulation.
## Registration Form

**International Conference**

**Design & Operation of Container Ships**

21-22 May 2014, London, UK

To register, simply complete all sections of this form and return it with your payment to:

**The Conference Department, RINA**

8-9 Northumberland Street

London, WC2N 5DA

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### Title (Dr, Mr, Eur Ing):


### Name (as it should appear on name badge):


### Position:


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### Invoice Address:


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### Please indicate your preferred method of payment:

- I enclose a cheque for:
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### How did you hear about this conference?


### Registration Fee (Inc VAT*)

<table>
<thead>
<tr>
<th>By 21/04/14</th>
<th>After 21/04/14</th>
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<tbody>
<tr>
<td><strong>RINA Members</strong>:</td>
<td>£700</td>
</tr>
<tr>
<td><strong>Non-members</strong>:</td>
<td>£800</td>
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<tr>
<td><strong>Concessions</strong>: (Retired/Students etc.)</td>
<td>£330</td>
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<tr>
<td><strong>Principal Author</strong></td>
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<tr>
<td><strong>Additional Author</strong></td>
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The registration fee includes printed conference papers, lunch, refreshments, reception, a CD of the papers and presentations after the conference, and VAT.

### Conference Papers

Delegates will receive a copy of the conference CD-ROM which will include the presentations, this will be posted out around 10-12 weeks after the conference.

Additional copies of the conference papers will also be for sale after the event in both print and CD-ROM versions. If you would like to order copies, please fill in the relevant sections.

If I am unable to attend the conference, please reserve me _______ set(s) of Conference proceedings:

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Payment must be made in pounds sterling by Eurocheque, cheque drawn on a bank with a UK branch address, credit card (Visa/Amex/Mastercard) or bank transfer. Please note RINA requires payment before the conference date.

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**Account Number**: 10042127

**Account Code**: 160016

**Bank Address**: Royal Bank of Scotland PLC, Belgravia Branch, 24 Grosvenor Place, London, SW1X 7HP, UK.

**IBAN**: GB14RBOS1600160000127

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*VAT: Under UK Customs and Excise regulations delegates from all countries are required to pay VAT on any course taking place in the UK. Delegates from outside the UK may be entitled to reclaim this cost.

### Venue

The Venue for the conference is RINA HQ, 8-9 Northumberland Street, London, WC2N 5DA

### Evening Drinks Reception

Following the end of day one (21/05/14), delegates are invited to attend an evening drinks reception at the conference venue.

### Accommodation

Upon registration you will be provided with details of a hotel booking service offering reduced rate accommodation for conference participants.

### Continuing Professional Development

RINA Certificates of Attendance will be issued at the event, which contributes towards the Institution’s Continuing Professional Development Scheme. For further details regarding the scheme please contact Giuseppe Gigantesco, Director, Professional Affairs on Tel: +44 (0)20 7235 4622 or e-mail: membership@rina.org.uk

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A number of sponsored places at this conference are available for Student Members of RINA. For more information, please contact Yuen Yee Pang, Professional Affairs, RINA on Tel: +44 (0)20 7235 4622 or e-mail: yypang@rina.org.uk

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If you are interested in any of these promotional opportunities please contact the Conference Organiser to discuss your individual requirements.

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Cancellations received in writing two weeks before the event takes place will be subject to administration charge of £200+VAT. Cancellations received after this time cannot be accepted and are subject to the full event fee. Delegates may be substituted; however, this must be sent in writing and confirmed with the conference Co-ordinator. It may be necessary for reasons beyond our control to alter the content and timing of the programme. In the unlikely event that RINA cancels the event for any reason, our liability is limited to the return of the registration fee.

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If you have any questions regarding this or any other RINA event please contact, Jade Whitelaw, Conference Organiser on:

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